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Comparative Analysis of Green Building Rating System

LEED® NC vs Build Green

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Executive Summary

The City of Vancouver's 2011 Green Rezoning Policy references LEED® NC Gold and Built Green Gold as tools to achieve the City of Vancouver's green building goals for Part 3 buildings. This report provides a comparison of the two standards; reviewed for rigour, enforceability and logistical requirements. Overall the findings suggest, both standards have their strengths: Built Green™ is very prescriptive providing developers with clear direction on what their building can do to achieve points, and LEED is very rigorous with a high level of third party review. Various strategies can be used to achieve the City of Vancouver's green building goals within each rating system and specific requirements can be identified to create a level playing field between the two ratings systems. Overall the LEED rating system is much more robust.

Introduction

Buildings represent 55% of community Greenhouse Gas (GHG) emissions in Vancouver. Driven by its Greenest City vision, the City has been working strenuously to develop and implement a range of ambitious policies aimed at reducing carbon-emissions from buildings.

Effective January 1st 2011, all rezonings are required to achieve LEED Gold with a minimum of 63 points and with a minimum of 6 Optimize Energy Performance points, 20% Water Use Reduction (prerequisite), and 1 Storm Water point. Alternatively, projects may pursue a minimum of LEED Multifamily Midrise, Built Green™ Multi-Storey and Residential Tower Gold (MS&RT) with a minimum of 35% better than MNECB, or Built Green for Homes Gold or LEED for Homes Gold, and a score of Energuide 82.

The focus of this study is to provide a comparative analysis to examine the relative effectiveness of the LEED-NC Canada 2009 Gold standard and Built Green Gold standard for Part 3 buildings and how they deliver on the City's sustainability goals.

Light House is an enthusiastic supporter of the City's green building policies and is delighted to see the new rezoning requirements roll out. We therefore concur with the timeliness of this study. It is important to fully understand how the various standards compare in order to provide useful information to industry while ensuring that the green building goals of developing well-built, high performance, low carbon buildings are achieved.



Rating System Comparison Summary

The two rating systems are quite different yet have beneficial similarities. They both are third party reviewed green building rating systems available to the building industry.

LEED NC was originally developed for office buildings and over time a number of credits have been adapted for Multi Unit Residential (MURB) applications. LEED has a very rigorous third-party review process; for every project CaGBC will audit a sample of credits. There is no physical site review other than a few photos required as part of the project documentation submission package. The majority of submitted projects will typically lose between one to three targeted points during the audit phase. Therefore a project must target above the minimum threshold to achieve the anticipated LEED level. LEED requires a specific professional consultant or owner to sign off on a declaration form for each credit.

LEED NC 2009 credits are highly descriptive and thorough. In many instances it requires a professional consultant (architect, civil engineer, mechanical engineer, landscape architect) to decipher if the credit is achievable. Many calculations are necessary to determine if a credit is achieved. For example the material recycled content credit is calculated based on the overall material only costs for divisions 2-10 and the percentage recycled content by cost for materials with recycled content. This contrasts with the approach used in Built Green, where for example a project can achieve one credit specifically for using drywall with a minimum 15% recycled content. The approach taken using LEED makes it a best guess during the design phase as to whether the credit will be achieved - this can only be confirmed during construction.

Built Green was originally developed for single-family residential homes and has grown to include multi storey residential towers since 2007. Built Green MS&RT is only applicable to stacked residential buildings (i.e. one apartment/condo unit on top of another unit or more). Built Green is focused primarily on reducing energy consumption of buildings and therefore directly ties the rating level with an energy performance rating. The rating system does not rely heavily on professional consultant input and verification and therefore provides consultant cost savings. It is third party reviewed, although not as rigorous as LEED.

Built Green MS&RT credits are very prescriptive. The rating system is written for builders and developers in a clear manner. Credits are specific to construction techniques and building details, providing if anything a list of ideas for builders to consider when designing/building a project. For example:

- Credit 1-14 Hot water storage tanks insulated by manufacturer to a minimum R-15 (2 points)*
- Credit 2-24 Recycled and/or recovered content gypsum wallboard, recycled content (min 15%)*
- Credit 2-31 All decks or balconies are thermally broken from the envelope by R10 (1 point) or fully separated (3 points).*

The checklist still references many low-rise residential construction techniques and methods, such as wood framing and requires updating.

Refer to Appendix A: Rating System Comparison, for an overall rating system comparison between LEED NC 2009 and Built Green MS & RT. The comparison includes administration process, timelines and costs associated with each.

City of Vancouver Requirements

City of Vancouver Green Buildings Policy for Rezoning (effective January 1, 2011) requires all rezonings for buildings that meet the minimum requirements to participate in the LEED for New Construction (NC) program, commit to achieving LEED Gold certification and specific LEED credit requirements. Built Green struggles to align with CoV requirements in the following two areas; water efficiency and stormwater requirements. Refer to the table below providing a quick summary. Further details are available in Appendix B:

Comparison of City of Vancouver Requirements			
	CoV Green Building Rezoning Requirement & Greenest City 2020 Initiative	LEED® NC 2009	Built Green™ MS&RT
Gold	63 LEED points	63 LEED points	100 Built Green BC points + MNECB 35%
Energy	33% better than MNECB	Optimize Energy Performance: 6 points (EAc1)	Gold min requirement
Water	20% water savings	Water use reduction Prerequisite (WEp1)	Water Conservation credit: 6-10 Install water meter in every unit.(3 points)
Stormwater	<p>Reduce stormwater runoff and improve water quality, including oil separation and infiltration facilities.</p> <p>By selecting one of the following:</p> <ol style="list-style-type: none"> 25% reduction in rate and quantity of stormwater runoff from 2yr 24 hr storm 0% increase in peak discharge rate and quantity for 1 and 2yr 24 storms over existing pre-development conditions Implement velocity and quantity control strategies that protect 	<p>Stormwater Design: Quantity Control (SSc6.1)</p> <p>or</p> <p>Stormwater Design: Quality Control (SSc6.2)</p>	<p>Not comparable but credits closest to requirement:</p> <p>Water Conservation credit: 6-9 Install permeable paving for driveways and walkways (2 points)</p> <p>6-14 Rain water capture (1 point)</p> <p>6-11 Stormwater management plan and install efficient irrigation (3 points)</p> <p>2-29 Green roof</p>

	<p>receiving waterways from excessive erosion</p> <p>4. Capture and treat 90% of average annual rainfall. Remove 80% of total suspended solids. Create management plan to minimize pollution and eutrophication of waterways from nitrogen and phosphorus (found in cleaning agents and fertilizers)</p>		
<p>CO2 Reductions</p>	<p>All new construction to be “carbon neutral in operations” by 2020</p> <p>CoV goal #2 in “Greenest City” by 2020</p>	<p>No specific credit. Although can target through the green power / renewable energy credit and continuing to increase the energy efficiency targets.</p>	<p>No specific credit although encouraged through renewable energy and green power offsets for building, during construction and within business practices</p>

Trade-offs

With each rating system there are trade-offs. These can be small and unnoticeable while some can be quite significant. The case is true between LEED and Built Green when comparing the requirements set forth in the City’s green rezoning policy. As noted in the previous section, Built Green struggles to meet LEED requirements for stormwater management. Therefore it may be that a project selecting the Built Green path would in addition to achieving Built Green Gold also be required to meet the referenced stormwater management LEED credits. In this case the City of Vancouver would be responsible to review the submitted documentation to ensure compliance OR a third party, Civil Engineer and Landscape Architect with LEED Accredited professional status, reviews and signs off on it.

Although not indicated as a specific requirement for the City’s Green Rezoning Policy, LEED has a number of pre-requisite (non-negotiable) credits that must be achieved for a project to pursue any level of LEED certification. Built Green does not require any specific credits but rather a minimum number of points per section (giving the builder the option which credits they pursue). The City’s Green Rezoning Policy does not specifically address a number of LEED pre-requisites. Therefore when aligning Built Green to LEED, Built Green projects would also need to align with LEED pre-requisites. The following is a list of those pre-requisites and what strategy may be applied to align with the Built Green program:

Sustainable Sites:

Construction Activity Pollution Prevention (SSp1)- Erosion and sedimentation control plan required to meet 2003 US EPA Construction General Permit or local standards/codes if more stringent.

To match pre-requisite requirements, Built Green projects would be required to meet the LEED requirement, submitting documentation to the City for review and approval. It is our understanding that CoV erosion and sedimentation control requirements are more stringent than the LEED referenced standard and therefore Built Green projects would meet the requirements.

Energy and Atmosphere:

Fundamental Commissioning of Building Energy Systems (EAp1)- commissioning review

To match pre-requisite requirements, Built Green projects would be required to meet the LEED requirement, submitting documentation to the City for review and approval.

Fundamental Refrigerant Management (EAp3)- zero CFC-based refrigerants in HVAC & R systems.

To match pre-requisite requirements, Built Green projects would be required to meet the LEED requirement, submitting documentation to the City for review and approval. Built Green does not have any credits that reference reducing greenhouse gases.

All LEED projects require their energy models be third party reviewed (if not completed by the preapproved CaGBC modeling list).

To match this requirement, Built Green projects would be required to have their energy model prepared or reviewed by an approved energy modeller, providing a modeling report to the City.

Materials & Resources:

Storage & Collection of Recyclables (MRp1)- requires adequate and accessible dedicated storage space for recycling and compost bins.

To match pre-requisite requirements, Built Green projects would be required to achieve 1 point under credit 5-11 for providing a central recycling center for paper, glass, and tin recycling. In addition the City would require projects to also include additional space for plastic and organic waste collection. The City may also consider making credit 5-10 mandatory which gives credit for builders who install built in recycling centers within each unit (credit 5-10, 2 points).

Indoor Environmental Quality:

Minimum Indoor Air Quality Performance (IEQp1)- Comply with ASHRAE 62.1-2007.

To match pre-requisite requirements, Built Green projects would be required to meet the LEED requirement, submitting documentation to the City for review and approval.

Environmental Tobacco Smoke Control (IEQp2)- if possible in MURB prohibit smoking in building. If not, then required to demonstrate acceptable sealing between residential units through an air pressure test.

To match prerequisite requirements, Built Green projects would be required to meet the LEED requirement, submitting final testing report by third party tester to the City for review and approval.

The City would need to prepare additional guidance for Built Green Builders to understand key requirements and documentation expectations for each of the above. Light House recommends a Built Green Application guide to the Rezoning Policy be developed where all of the additional criteria or credits are clearly presented.

LEED NC is very thorough and time consuming, costing the client time and money in consultant fees.

Built Green MS& RT is quicker and more straightforward, saving time and money, although the audit process is not as robust.

The primary trade off between the two programs is that the end result is not the same and LEED is much more robust. Therefore to level the playing field for Built Green MS & RT projects, the City may be required to review compliance rather than strictly relying on the Built Green audit process or the City may require an additional independent third party representative review their credits and submittals and report to the City.

Recommendations

LEED NC is more robust than Built Green, however referencing a second rating system option in the Green Rezoning Policy that is more prescriptive is useful in helping industry move forward quicker and easier. If Built Green MS & RT Gold is referenced as equivalent to LEED, it is recommended that the City add an additional layer of review as described in the Trade-off section of this report and/or requirements to ensure the City of Vancouver Policy targets are being met with robustness. A Built Green Application guide may be necessary to address this.

COV could potentially require applicants that opt in to Built Green to work with a third party evaluator to review their credits and submit a report to the City.

Update the City of Vancouver Green Buildings Policy for Rezoning to reference the latest LEED reference guide LEED 2009.

Providing legal opinion on enforceability of the standards in the City's Green Rezoning Policy is not considered part of this project. The recommendation and guidance provided in this report is for information only.



Appendix A: Rating System Comparison



Rating System Comparison Summary



		LEED® NC 2009	Built Green™ MS & RT version: January 1, 2011 (update revision expected early July 2011)
General Information	Program owned and managed by:	LEED® (Leadership in Energy and Environmental Design) is a registered trademark of the U.S. Green Building Council (USGBC), licensed to the Canadian Green Building Council (CAGBC)	Built Green Canada, is a federally chartered non-share, non-profit corporation governed by a Board of Directors
	Qualifications	LEED Accredited Professional (AP) not required but do achieve a credit for having one	Builder/Renovator must take the Built Green training and be a member of a professional building association.
	Primary Resource	LEED NC Canada 2009 reference guide \$325 member/ \$525 non member	Built Green MS&RT checklist
	Training	LEED Associate plus LEED Building design + construction Exam \$400 member/ \$550 non member Optional workshops for exam preparation	Built Green™ Builder Training 2-day Workshop for builders and renovators \$700 member /\$900 non-member -mandatory-
Scope	Type of Building	Residential and non residential buildings greater than three stories	Multi-Storey and Residential Tower
	Market Segment	Multi family homebuilders and commercial developers	Multi family homebuilders and residential developers. Only certified Built Green™ builder members can build a Built Green™ home.
	Who will use it?	Developers, Architects and Municipalities	Membership in Built Green™ is open to all members of participating Home Builders' Associations including builders, renovators, product suppliers or manufacturers, service providers, community developers and municipalities.
Project Registration			
When to register?	Anytime	Before start of construction. In some cases, projects can be enrolled after the start of construction.	
Fee	Per Floor Area Fee Range (min to max) Registration \$500 to \$3,000 CAGBC member \$750 to \$4,800 non member Fees are calculated based on a projects floor area . example: 13 storey MURB, 106 units, GFA=117,000sqft (10,870m2) \$1,420 member/\$2,280 non member	Per Unit Enrolment fee \$100 - \$175 plus \$75 or \$100 per unit example: 13 storey MURB, 106 units GFA=117,000sqft (10,870m2) \$8,050-\$10,775	
How to register?	Online Complete general project information sheet.	Phone Built Green Submit checklist and baseline energy model	
Project Certification			
When to submit?	After building occupancy. Typically 3 months after.	After project completion.	
Fee	Certification \$3,700 to \$18,500 CAGBC member \$5,550 to \$27,400 non member Fee is calculated based on the project floor area. example: 13 storey MURB, 106 units, GFA=117,000sqft (10,870m2) \$9,770 member/\$14,500 non member	No Fee All costs are covered in one time enrolment fee.	
What to submit?	Letter templates signed by professional project consultants. Additional documentation and calculations as required by credit.	Updated Checklist- if changed during construction Final Energy model	
Review process	Every project is reviewed for completeness and a number of credits are audited at random 1st Review Phase Project Submittal	Min. 5% of certified projects are audited. Every Builder will have at least one project audited within 12-24 months. Builder given a short amount of time to compile documentation.	

	<p>Completeness Check Review</p> <p>2nd Review Phase Project Submittal Completeness Check Review</p> <p>Certification</p>	<p>Audit documentation may include: installing contract letter, supplier verification letter, invoice or purchase order as well as an on-site visual verification.</p> <p>One shot. If information is missing the required details, the credit is rejected.</p> <p>If deficiencies in the checklist are found, follow up on site inspections will be done to verify corrections at the expense of the Builder.</p>
Who reviews it?	CAGBC staff and Technical Advisory Group	Built Green Canada and Certified energy manager
How long?	<p>Uncertain</p> <p>Minimum 50 days from submission. More realistically 1 year.</p> <p><i>As of May 1, 2011 it takes CAGBC a minimum of 3 months to do the first completeness check.</i></p>	Immediately after project completion unless project is being audited.
Certificate	Plaque and certificates	Plaque or certificate

Rating System Overview

Degree of Green and Spread of Performance Requirements	<p>A point system of prerequisites and potential credits in the following performance categories:</p>	<p>Certification depends on modeled energy performance plus checklist. Checklist has points in 7 categories:</p>
	<p>Sustainable Sites Water Efficiency Energy and Atmosphere Materials & Resources Indoor Environmental Quality Innovation & Design Process</p>	<p>Operational Systems Building Materials Exterior and Interior Finishes Indoor Air Quality Waste Management Water Conservation Business Practices</p>
	<p>Four certification levels:</p> <p>Certified 40-49 Silver 50-59 Gold 60-79 Platinum 80+</p>	<p>Four certification levels:</p> <p>Bronze 81 Silver 90 Gold 100 Platinum 120+ + minimum energy performance per certification level.</p>
	<p>Maximum # of points: 110 points</p>	<p>Maximum # of points: 431 points</p>

Credit Category Overview

Energy	<p>Prerequisites: 23% cost improvement MNECB 1997 or 10% reduction in energy cost over that in ASHRAE/IESNA 90.1-2007. Fundamental commissioning of energy system and no CFC's.</p> <p>Highlights: Points for verification of building's performance after construction (energy model and measurement and verification).</p> <p>Summary: Wide range of issues addressed including: energy performance levels, renewable energy, verification of performance, and HCFC's.</p>	<p>Prerequisites: Energy performance better than MNECB: Bronze 10% Silver 25% Gold 35% Platinum 50% Plus a minimum of 32 points.</p> <p>Highlights: High points value for the installation or use of renewable energy systems. Verification of energy performance after construction (through energy model)</p> <p>Summary: Focus on the installation of energy-efficient products and systems.</p>
Water	<p>Prerequisites: 20% reduction in potable water</p> <p>Highlights: Points for reducing potable water usage for sewage conveyance by 50%.</p> <p>Summary: No requirements for products or systems.</p>	<p>Prerequisites: Minimum of 7 points.</p> <p>Highlights: Points for incorporation of xeriscaping.</p> <p>Summary: Focus on the installation of products and systems that conserve water.</p>
	<p>Prerequisites: Meet ASHRAE 62-2001 standard for Ventilation for Acceptable Indoor Air Quality. Environmental tobacco smoke control: Non smoking building or air leakage testing between suites,</p>	<p>Prerequisites: Minimum of 15 points.</p>

IEQ	<p>Highlights: Points for providing controllable lighting and natural ventilation systems for occupants.</p> <p>Summary: Wide range of issues addressed including: tobacco smoke, CO2 monitoring, pre-occupancy flush, low emission materials and finishes, controllability of systems, and daylighting.</p>	<p>Highlights: Points available for the following additions to HVAC system: install pleated media filter, electrostatic air cleaner, electronic air cleaner, HEPA filtration system, ultraviolet air purifier, power drum humidifier, drip type humidifier.</p> <p>Summary: Focus on the installation of air filtration systems and low-emission materials and finishes.</p>
Materials	<p>Prerequisites: None</p> <p>Highlights: Points for the development and implementation of a durability plan in accordance with CSA S478-95 (R2001).</p> <p>Summary: Focus on incorporating a range of sustainable materials (salvaged, recycled, regional, certified).</p>	<p>Prerequisites: Minimum of 10 points for interior and exterior finishes.</p> <p>Highlights: Recycled content in the following: gypsum wallboard (min. 15%), wall sheathing (min. 50% content), rain screen (min. 60%), carpet underlayment (100%).</p> <p>Summary: Focus on recycled content in building materials.</p>
Waste	<p>Prerequisites: Space for collection, separation and recycling of materials.</p> <p>Highlights: Points for maintaining a significant percentage of existing building materials.</p> <p>Summary: Addresses maintenance of existing building materials and diversion of both construction and household waste from landfill.</p>	<p>Prerequisites: Minimum of 7 points.</p> <p>Highlights: Points for having suppliers and trades recycle their own waste.</p> <p>Summary: Addresses maintenance of existing building materials and diversion of both construction and household waste from landfill.</p>
Site	<p>Prerequisites: Sediment and erosion control plan specific to the site.</p> <p>Highlights: Points for a stormwater treatment system to remove suspended solids and phosphorus.</p> <p>Summary: Wide range of issues addressed including: site protection/restoration, alternative transportation, stormwater management, urban heat island effect, and light pollution.</p>	<p>Prerequisites: None (criteria addressed under waste, water, and business practice categories)</p> <p>Highlights: Points for use of materials derived from local construction sites, manufactured locally,</p> <p>Summary: Focus on protection of natural features,</p>
Business Practices	<p>Prerequisites: None</p> <p>Highlights: Can be achieved through innovation credits such as Green Housekeeping, Education, Green Landscaping,</p> <p>Summary: No specific criteria for building industry businesses</p>	<p>Prerequisites: Minimum of 9 points.</p> <p>Highlights: Points for diversity of housing types, builders office and sales centre offsets energy with green power purchasing, builders office is a green building, builder agrees to construct 50%+ of projects as green.</p> <p>Summary: Focus on builder and manufacturer office and business practices, community benefits</p>

Appendix B: Rating Comparison for City of Vancouver Rezoning Requirements



City of Vancouver Requirements	
Gold Rating	
CoV requires the project to achieve Gold Rating with minimum 63 LEED points	
LEED® NC 2009	Built Green™ MS & RT version: January 1, 2011 (update revision expected end of June 2011)
Gold: 60-79 points	Gold: 100 points + 35% better than MNECB 1997
Advise	<p><i>Why 63 points?</i></p> <p><i>How important to CoV are prerequisites? Should these also be compared against Built Green?</i></p>
<p><i>How to compare 63 LEED points to 100?</i></p> <p><i>Is there a threshold above 100 the CoV would wish to target?</i></p>	
Energy	
CoV requires the project to achieve a minimum of 6 LEED energy points	
LEED® NC 2009	Built Green™ MS & RT
LEED 2009 EAc1 6 energy points: * 22% better than ASHRAE 90.1-2007 * 33% better than MNECB 1997	Gold Minimum 35% better than MNECB 1997
Comments	Exceeds City of Vancouver requirements by 2%.
Robustness	<p><i>Specific guidelines on how model is to be done are in the reference guide and in a "LEED Canada Energy Modelling Rules".</i></p> <p><i>Model based on construction set drawings. Any revisions during construction are not required to be captured in the final energy model.</i></p> <p><i>Model is third party reviewed.</i></p>
Advise	<p><i>No guidelines or rules on what is and is not included in the energy model.</i></p> <p><i>Initial energy model is completed and submitted at time of registration (prior to construction). A revised model is submitted at time of certification. Revisions only necessary if changes were made during construction.</i></p> <p><i>Model is not third party reviewed.</i></p> <p><i>Potential to include GHG emission estimate based on the energy model.</i></p> <p><i>Require third party review and follow LEED modeling rules and guidelines</i></p> <p><i>Require credits for Energy Star Appliances</i></p>
Water Efficiency	
CoV requires the project to achieve a minimum of 1 LEED water saving credit	
LEED® NC 2009	Built Green™ MS & RT
<p>CoV requires 1 point as per LEED-NC v1.0 equates to 20% water savings. For LEED-NC 2009 a 20% water use reduction is now a prerequisite. The minimum water savings % for each point threshold is as follows:</p> <p>LEED 2009 WEc3 2 points – 30% 3 points – 35% 4 points – 40%</p> <p>Individual suite water meters = 20% reduction</p> <p>Water efficiency credits can also be achieved with landscaping irrigation and innovative water technologies (composting toilets).</p>	<p>Minimum 7 points for water efficiency:</p> <p>Suggest selecting specific water efficiency credits that are inline with City of Vancouver Green</p> <p>Guidelines, in order of importance:</p> <ol style="list-style-type: none"> 1. Water meter for every unit 2. Low flow toilets 1.6GPF (6L/flush) 3. Dual flush 1.2 GPF (5.5L/flush) 4. Aerators 3.8LPM –bathroom 5. Aerators 6.8LPM- kitchen 6. Front loading clothes washer 7. Water saving dishwasher 26L/load 8. Capture rainwater 9. 50% reduction of lawn/turf 10. Efficient irrigation system with collection system 11. Greywater collection 12. Drought tolerant plants

		<p>13. Hot water recirculation line 14. Insulate water lines and tank 15. Permeable pavers</p>
Comments	<p><i>If reference is LEED NCv1.0 then remove 1 credit requirement.</i> <i>If reference is LEED 2009 then revise criteria to 2 points for 30% water savings</i></p>	
Robustness	<p><i>Estimated water savings are calculated by using prescribed baseline flow rates and flushes and then comparing these to the proposed case. Calculation is based on # of occupants and not number of fixtures. LEED defines a default uses per person per fixture.</i></p> <p><i>Kitchen faucets, clothes washers and dishwashers are not included in LEED calculation.</i></p>	<p><i>Water savings are not calculated but achieved through a combination of actual fixture selections.</i></p> <p><i>Low flow toilets (6L/flush) matches the LEED baseline.</i></p> <p><i>Bathroom faucets (3.8LPM) exceed LEED baseline (5.7LPM) although not clear what water pressure the rate is measured using.</i></p> <p><i>Dual flush toilet credit requires one toilet per unit to be dual flush. Additional point for all bathrooms.</i></p> <p><i>Included kitchen faucets, clothes washers and dishwashers.</i></p> <p><i>Excludes option for low flow shower heads</i></p>
Advise	<p><i>Require water meters + include water efficient clothes washers and dishwashers be included in calculation.</i></p>	<p><i>Require water meters per unit to ensure 20% minimum + items 2 to7 as mandatory.</i></p>

Stormwater

<p>CoV requires the project to achieve a minimum of 1 LEED stormwater credit</p>		
	<p>LEED® NC 2009</p>	<p>Built Green™ MS & RT</p>
	<p>CoV requires 1 storm water credit: SSc 6.1- Stormwater quantity (1 point) SSc 6.2- Stormwater quality (1 point)</p>	<p>Stormwater related credits: 6-9 Install permeable paving for driveways and walkways (2 points) 6-14 Rainwater capture (1 point) 6-11 Install Efficient Irrigation Technology with collection system- requires stormwater management plan and design, plan for neighbourhood stormwater management principles and strategies including run-off and controlling rates. (3 points) 2-29 Green roof 50%(3 points), 75% (5 points), 100% (7points)</p>
Comments	<p><i>Does the city have any requirements for stormwater quality/quantity? If so does it meet LEED requirements?</i></p>	<p><i>No specific post construction treatment of runoff.</i> <i>No details as what is included in a stormwater management plan.</i> <i>No referenced standards to follow.</i> <i>Permeable paving not defined. How permeable?</i></p>
Robustness	<p><i>More stringent than Built Green</i></p>	<p><i>Not as stringent as LEED requirements</i></p>
Advise	<p><i>no change</i></p>	<p><i>If city has policy/bylaw then intent achieved. Otherwise require credit 6-11 (3 points) and 6-9.</i></p>

CO2 reductions

<p>All new construction to be "carbon neutral in operations" by 2020 CoV goal #2 in "Greenest City" by 2020.</p>		
	<p>LEED® NC 2009</p>	<p>Built Green™ MS & RT</p>
	<p>Benefits for reduced parking, access to transit, locating in dense areas with amenities in walking distance, electric plug ins, car co-op, local regional materials</p>	<p>No consideration for site selection to reduce carbon emission.</p>
	<p>Green power credit - purchase green power to offset energy consumption</p>	<p>Green power credit- offset construction energy consumption Green power credit- first year prepaid by build</p>
	<p>Renewable energy credits- offset power demands with renewable onsite energy production.</p>	<p>Renewable energy credits- offset electrical energy load for private and common areas Solar ready credit- reserve 10%minimum of roof area and installed conduit. Domestic hot water alternative energy credit- 25% peak, 70% total load with 50% Exterior ramp heating credit- heated with waste heat or renewable energy</p>
	<p>Innovation and design credit can be used for Energy Star appliances</p>	<p>Operational systems – Energy Star equipment, requirements.</p>
	<p>Measurement and Verification credit- provide framework to allow tracking and review of energy/water consumption which could be translated into carbon consumption.</p>	<p>Business practices: office and sales office to use 50% renewable energy, hybrid biodiesel company vehicles, local regional materials</p>
Comments	<p><i>No specific credit to quantify the carbon consumption. Can encourage fulfilling city targets through the green power/ renewable energy credit and continuing to increase the energy efficiency targets.</i></p>	<p><i>No specific credit to quantify the carbon consumption. Although encouraged through renewable energy and green power offsets for building, during construction and within business practices.</i></p>